

Abstract Submitted
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Performance Limit and Scaling Behaviors of Carbon Nanoribbon Transistors JING GUO, YIJIAN OUYANG, Dept. of ECE, University of Florida — Carbon-based nanostructures promise near ballistic transport and are being intensively explored for device applications. In this work, the performance limits of carbon nanoribbon (CNR) field-effect transistors (FETs) are assessed using a semiclassical model, and compare to those of carbon nanotube (CNT) FETs. The ballistic channel conductance and the quantum capacitance of the CNRFET are about a factor of 2 smaller than those of the CNTFET, because of the different valley degeneracy factors for CNTs and CNRs. The intrinsic speed of the CNRFET is faster due to a larger average carrier injection velocity. The gate capacitance plays an important role in determining which transistor delivers a larger on-current. The scaling behaviors of CNRFETs are studied using an atomistic quantum simulation.

Yijian Ouyang
Dept. of ECE, University of Florida

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